In the Claims:

1-48. (Canceled)

49. (New) A switch device having a first state and a second state, the switch device comprising:

a cavity occupied by at least one particle described by a wavefunction and an electric energy, wherein the first state is defined when said wavefunction has a first spatial size in at least one dimension and said electric energy has a first distribution, and the second state is defined when said wavefunction has a second spatial size in said at least one dimension and said electric energy has a second distribution;

a mechanism for changing said electric energy, such that when said energy is below a predetermined level, said wavefunction has said first spatial size, and when said energy is above said predetermined level, said wavefunction has said second spatial size; and

and at least one element having at least one charge carrier therein and being designed and constructed such that a change in said electric energy from said first distribution to said second distribution results in a change in potential difference between said at least one charge carrier and said at least one particle.

50. (New) The device of claim 49, wherein said mechanism is configured to induce repulsive potential on said at least one particle, whereby increment of said repulsive potential results in a change of the spatial size of said wavefunction.

51. (New) The device of claim 49, wherein said mechanism is configured to induce attractive potential on said at least one particle, whereby increment of said attractive potential results in change of the spatial size of said wavefunction.

52. (New) The device of claim 49, characterized in that said at least one particle remains bound to said cavity while said wavefunction has said first spatial and while said wavefunction has said second spatial size.

53. (New) The device of claim 49, wherein said at least one element having said at least one charge carrier comprises at least one charged object positioned outside said cavity, such that an electric potential on said at least one charged object is indicative of the spatial size of said wavefunction.

54. (New) The device of claim 49, wherein said at least one element having said at least one charge carrier comprises at least two charged objects positioned outside said cavity, such that an electric potential between said charged objects is indicative of the spatial size of said wavefunction.

55. (New) The device of claim 49, wherein said at least one element having said at least one charge carrier comprises a charge current conductor, for conducting a charge current when said wavefunction has said first spatial size.

56. (New) The device of claim 54, wherein said cavity comprises a first region and a second region, arranged in a manner such that said first spatial size of said wavefunction extends over said first region, and said second spatial size of said wavefunction extends over both said first and said second region.

57. (New) The device of claim 56, wherein said charged objects are positioned such that when near said second region.

58. (New) The device of claim 49, further comprising means for detecting in real-time a developing change in the spatial size of said wavefunction.

59. (New) The device of claim 58, wherein said means for detecting said change in said wavefunction comprises a charge current conductor, for conducting a charge current in response to said change in said spatial size of said wavefunction.

60. (New) The device of claim 49, wherein said cavity comprises a doped layer, and an undoped layer deposited on said doped layer such that when said wavefunction has said first spatial size, said wavefunction occupies said doped layer, and when said wavefunction

has said second spatial size, said wavefunction occupies said doped layer and said undoped layer.

61. (New) The device of claim 60, wherein said at least one element having said at least one charge carrier comprises:

at least two insulating layers, deposited on said doped layer and being laterally displaced from said undoped layer;

at least two conducting contacts attached to said at least two insulating layers, said at least two conducting contacts having a potential difference therebetween; and

a conducting layer being in electric communication with said conducting contacts;

wherein said occupation of said undoped layer by said wavefunction results in a change of conduction current flowing through said conducting layer.

62. (New) The device of claim 49, wherein said cavity comprises a doped layer, and said mechanism comprises:

at least one insulating layer deposited on said cavity; and

at least one conducting contact connected to a voltage source and being deposited on said at least one insulating layer such that flow of charge carriers to and from said cavity is prevented, but when sufficient voltage is applied to said at least one conducting contact, said wavefunction has said second spatial size.

63. (New) The device of claim 62, wherein said at least one element having said at least one charge carrier comprises:

an additional doped layer; and

a source-drain arrangement deposited on said additional doped layer and being laterally displaced from said cavity and said insulating layer, such that when said wavefunction has said second spatial size, an inversion layer appears in said additional doped layer and charge carriers from said source-drain arrangement flow through said additional doped layer.

64. (New) The device of claim 63, further comprising an insulating layer interposed between said doped layer and said cavity so as to prevent flow of charge carriers to and from said cavity.

65. (New) The device of claim 63, wherein said doped layer is a doped semiconductor layer.

66. (New) The device of claim 63, wherein said doped layer is a doped organic layer.

67. (New) The device of claim 63, wherein said doped layer is made of isolating material.

68. (New) The device of claim 62, wherein said at least one conducting contact comprises two conducting contacts of equal electric polarity.

69. (New) The device of claim 62, wherein said at least one conducting contact comprises two conducting contacts of opposite electric polarity.

70. (New) The device of claim 49, wherein:

(a) said cavity comprises an n type layer;

(b) the device further comprises at least one insulating layer deposited on said cavity;

(c) said mechanism comprises

(i) an n type silicon wafer,

(ii) an intermediate insulating layer interposed between said n type silicon wafer and said cavity,

(iii) a voltage source, and

(iv) first conducting contacts connecting said voltage source with said at least one insulating layer; and

(d) said at least one element having said at least one charge carrier comprises:

(i) a p-type source layer and a p-type drain layer deposited on said n type silicon wafer and being laterally displaced from said intermediate insulating layer, and

(ii) second conducting contacts connected to said p-type source layer and said p-type drain layer;

said cavity, said mechanism and said element being designed and constructed such that when a voltage of positive polarity is applied to said first conducting contacts, said wavefunction is extended within said n type layer, resulting in hole conduction towards said n type layer and formation of an inversion layer in said n type silicon wafer, which in turn results in current conduction between said p-type source layer and said p-type drain layer.

71. (New) The device of claim 70, wherein:

said cavity comprises polysilicon doped with phosphorus atoms;

said n type silicon wafer is doped with phosphorus atoms;

said at least one insulating layer comprises a silicon oxide layer;

said p-type source layer and said p-type drain layer are doped with boron atoms; and

said first conducting contacts and said second conducting contacts comprise aluminum.

72. (New) The device of claim 49, further comprising a kinetic energy changing mechanism for changing the kinetic energy of said at least one particle thereby to change the spatial size of said wavefunction.

73. (New) The device of claim 72, wherein:

(a) said cavity comprises a silicon layer doped with phosphorus atoms at a concentration of 10^{17} atoms per cubic centimeter, and having dimensions of about 4 micrometers in length, about 2 micrometers in width and about 200 angstroms in thickness;

(b) said mechanism comprises:

(i) silicon oxide insulating layers contacting said cavity,

(ii) a voltage source, and

(iii) conducting contacts connecting said voltage source with said silicon oxide insulating layers; and

(c) said at least one element having said at least one charge carrier comprises:

(i) an undoped silicon layer,

(ii) additional silicon oxide insulating layers contacting said undoped silicon layer, and

(iii) an aluminum current conductor deposited on said additional silicon oxide insulating layer;

said cavity, said mechanism and said element being designed and constructed such that when a voltage is applied to said conducting contacts of said mechanism, said kinetic energy is increased, said wavefunction is extended to said undoped silicon layer and an induced current flows in said aluminum current conductor.

74. (New) The device of claim 49 comprising.

(a) said cavity comprises a mixed type layer doped with n type dopants and positive ions;

(b) the device further comprises at least one insulating layer deposited on said cavity;

(c) said mechanism comprises

(i) a p type silicon wafer,

(ii) an intermediate insulating layer interposed between said p type silicon wafer and said cavity,

(iii) a voltage source, and

(iv) first conducting contacts connecting said voltage source with said at least one insulating layer; and

(d) said at least one element having said at least one charge carrier comprises:

(i) a n-type source layer and a n-type drain layer deposited on said p type silicon wafer and being laterally displaced from said intermediate insulating layer, and

(ii) second conducting contacts connected to said n-type source layer and said n-type drain layer;

said cavity, said mechanism and said element being designed and constructed such that:

when a voltage of positive polarity is applied to said first conducting contacts, said wavefunction is extended within said mixed type layer, resulting in approximately neutral electric potential of said mixed type layer; and

when a voltage of reduced positive polarity or of negative polarity is applied to said first conducting contacts, said wavefunction returns to said first spatial size, resulting in a positive electric potential of said mixed type layer, electron conduction towards said mixed type layer, form of an inversion layer in said p type silicon wafer and current conduction between said n-type source layer and said n-type drain layer.

75. (New) The device of claim 49, further comprising a magnetic energy changing mechanism for changing the magnetic energy of said at least one particle thereby to change the spatial size of said wavefunction.

76. (New) The device of claim 49, wherein said at least one particle is selected from the group consisting of at least one electron, at least one neutron, at least one proton, at least one atom, at least one molecule and any combination thereof.

77. (New) The device of claim 49, serving as a component in an energy detection device.

78. (New) The device of claim 49, serving as a component in a device having at least three switching states.

79. (New) A switch device having a first state and a second state, the switch device comprising:

a cavity occupied by at least one particle described by a wavefunction and an electric energy, wherein the first state is defined when said wavefunction has a first spatial size in at least one dimension and said electric energy has a first distribution, and the second state is defined when said wavefunction has a second spatial size in said at least one dimension and said electric energy has a second distribution;

a mechanism for changing said electric energy, such that when said energy is below a predetermined level, said wavefunction has said first spatial size, and when said energy is above said predetermined level, said wavefunction has said second spatial size; and

a source of photons and a photons detector arranged for detecting whether said wavefunction has said first spatial size or said second spatial size

80. (New) The device of claim 79, wherein said source of photons and said photons detector are arranged to allow detection of photon absorption.

81. (New) The device of claim 79, wherein said source of photons and said photons detector are arranged to allow detection of photon scattering.

82. (New) The device of claim 79, wherein said source of photons and said photons detector are arranged to allow detection of photon transmission.

83. (New) The device of claim 79, serving as a component in an energy detection device.

84. (New) The device of claim 79, serving as a component in a device having at least three switching states.

85. (New) A switch device having a first state and a second state, the switch device comprising:

a cavity occupied by at least one particle described by a wavefunction, wherein the first state is defined when said wavefunction has a first spatial size and the second state is defined when said wavefunction has a second spatial size;

a photon or phonon source positioned outside said cavity and configured to change the energy of said at least one particle, such that when said energy is below a predetermined level, said wavefunction has said first spatial size, and when said energy is above said predetermined level, said wavefunction has said second spatial size; and

an additional source of photons for directing photons to a region in said cavity so as to detect distribution of said at least one particle in said region thereby to determine whether said wavefunction has said first spatial size or said second spatial size.

86. (New) The device of claim 85, further comprising a photons detector arranged for detecting whether said wavefunction has said first spatial size or said second spatial.

87. (New) The device of claim 86, wherein said source of photons and said photons detector are arranged to allow detection of photon absorption.

88. (New) The device of claim 86, wherein said source of photons and said photons detector are arranged to allow detection of photon scattering.

89. (New) The device of claim 86, wherein said source of photons and said photons detector are arranged to allow detection of photon transmission.

90. (New) The device of claim 85, further comprising at least one charged object positioned outside said cavity, such that an electric potential on said at least one charged object is indicative of the spatial size of said wavefunction.

91. (New) The device of claim 85, further comprising at least two charged objects positioned outside said cavity, such that an electric potential between said charged objects is indicative of the spatial size of said wavefunction.

92. (New) The device of claim 85, wherein said cavity comprises a doped layer, and the device further comprises:

at least one insulating layer deposited on said cavity; and

at least one conducting contact connected to a voltage source and being deposited on said at least one insulating layer such that flow of charge carriers to and from said cavity is prevented;

said doped layer being designed and constructed such that when at least one photon interacts with dopants in said doped layer, said wavefunction has said second spatial size, and when voltage is applied to said at least one conducting contact, said wavefunction returns to said first spatial size.

93. (New) The device of claim 92, further comprising

an additional doped layer; and

a source-drain arrangement deposited on said additional doped layer and being laterally displaced from said cavity and said insulating layer, such that when said

wavefunction has said second spatial size, an inversion layer appears in said doped layer and charge carriers from said source-drain arrangement flow through said additional doped layer.

94. (New) The device of claim 85, serving as a component in an energy detection device.

95. (New) The device of claim 85, serving as a component in a device having at least three switching states.

96. (New) A switch device comprising:

(a) a container occupied by at least one particle and having at least a first region and a second region;

(b) at least one electrode disposed over said first region; and

(c) a mechanism for generating a motion of said at least one particle between said first region and said second;

said at least one electrode being designed and constructed to generate a signal when said at least one particle occupies said first region.

97. (New) The device of claim 96, wherein said at least one electrode is designed and constructed such that when said at least one particle occupies said first region said at least one electrode is at a first electrical potential, and when said at least one particle occupies said first region, said at least one electrode is at a second potential.

98. (New) The device of claim 96, wherein said at least one electrode is designed and constructed such that when said at least one particle occupies said first region, electrical current flows in said at least one electrode.

99. (New) The device of claim 96, wherein said at least one electrode is designed and constructed such that when said at least one particle occupies said second region, electrical current flows in said at least one electrode.

100. (New) The device of claim 96, wherein said at least one electrode is designed and constructed such that when said at least one particle occupies said first region, a first electrical current flows in said at least one electrode, and when said at least one particle occupies said second region, a second electrical current flows in said at least one electrode.

101. (New) The device of claim 96, serving as a component in an energy detection device.

102. (New) The device of claim 96, serving as a component in a device having at least three switching states.